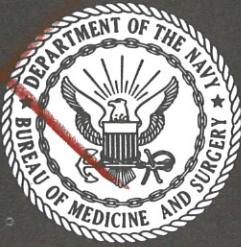


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United States Navy
MEDICAL NEWS LETTER

Vol. 44

Friday, 27 November 1964

No. 10

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Policy

The U.S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, sus-

ceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

Change of Address

Please forward changes of address for the News Letter to: Commanding Officer, U.S. Naval Medical School, National Naval Medical Center, Bethesda, Maryland 20014, giving full name, rank, corps, and old and new addresses.

FRONT COVER: The Center Patio of the U.S. Naval Hospital, San Diego, California. The hospital and grounds, covering an area of 92.2 acres, are located on a hilltop northeast of the downtown area of San Diego, in Balboa Park which overlooks the Pacific Ocean and San Diego Bay. The buildings are of modern construction, primarily of Spanish design, with the exception of the splendid new 1000 bed surgical wing, which is of modern concrete and glass.

The operating bed capacity of the hospital is 1,891. The San Diego Naval Hospital, in addition to being a general hospital, operates special facilities for the diagnosis and treatment of Coccidioidosis, Tuberculosis, Neurosurgery, Oncology, Plastic Surgery, Thoracic and Cardiovascular Surgery, Acrylic Ocular Prosthesis, and Clinical Radioisotopes. In a recent year there were 486,526 outpatient visits, 27,324 admissions to the hospital, 3,798 deliveries, and 1,353 daily average occupied beds.—Editor

The issuance of this publication approved by the Secretary of the Navy on 4 May 1964.

U.S. NAVY MEDICAL NEWS LETTER

The U.S. Navy Aural Rehabilitation Center

CDR G. R. Hart MC USN—Director, Aural Rehabilitation Center, United States Naval Hospital, Philadelphia, Pennsylvania.

The Aural Rehabilitation Center was established at the U.S. Naval Hospital, Philadelphia, Pa. on 15 July 1944 by the Surgeon General of the Navy, VADM Ross T. McIntire. This Center started operation on 7 August 1944. Twenty years and 30,558 patients later it continues today as the Aural Rehabilitation Center of the Navy.

The criteria for the referral of active duty service patients to the Aural Rehabilitation Center are detailed in the Manual of the Medical Department, Article 12-3 (1) CH 14, as follows:

"Patients requiring aural rehabilitation shall not be transferred to a special treatment facility unless the true loss of hearing in the better ear is more than 30 decibels in the conversational range (256-2048 cycles) or unless the hearing of the whispered voice in the better ear is less than 3/15. Authority for transfer shall be requested as soon as it is determined that these conditions exist."

Although the rehabilitation patient load has decreased since the war years, the hearing problems and demands for hearing testing and evaluation have increased. The added awareness of noise-induced hearing loss and increased interest in preventive measures, as evidenced in BuMed Instructions 6260.6 of 1955 and 6260.6A of 1959, have contributed to an increased demand for hearing tests and evaluation of noise-induced hearing loss, as well as the requirements for audiometric testing at the time of all examinations for enlistment, re-enlistment, discharge, and the annual physical examination of officers.

Aural rehabilitation implies a thorough evaluation of the nature and cause of hearing loss and the application of all procedures directed toward the maximum utilization of residual hearing. The rehabilitation procedure may involve one or more methods such as treatment of the ear and related regional disease, the use of a prosthetic device (hearing aid), the retraining and readjustment of the individual in the use of his residual hearing ability, instruction in the conservation of hearing, and final disposition of the patient, either

by return to his regular or modified duties or separation from the service.

In all probability, aural rehabilitation, in the minds of most people, is directed toward the retraining and readjustment of the hard-of-hearing individual who must turn to the use of a hearing aid in order to regain sufficient communicative abilities to earn a living and enjoy adequate social status. Aural rehabilitation in this sense consists of a four week course of auditory retraining, of speech (lip) reading and the fitting of and familiarization with an individual hearing aid.

Generally speaking, this program operates to develop the patient's ability to recognize and use all related sensory stimuli which are of importance in every day communication, both of an auditory and a visual nature. For this reason speech (lip) reading is included in this program, not as an alternative to hearing, but as a related visual aid in the recognition and interpretation of auditory clues. In many instances, auditory clues come to a patient via his hearing aid. Many persons with a sensory-neural loss, however, discover that the amplification provided by means of a hearing aid is not a complete and satisfactory substitute for the hearing acuity that has been lost, particularly in the discrimination of various sounds. These persons must learn that it is necessary to compensate for the auditory limitations inherent in a hearing aid by means of an increased awareness of the gestures, motions, expression, and mouth and facial movements that become an integral part of the process of communication. In this sense, the conditioning of the patient to amplified sound and the careful selection and issue of his individual hearing aid are the beginning of the training and daily class instruction extending over a period of four weeks.

When an individual is admitted to the hospital for Aural Rehabilitation, he is assigned to one of the otologists of the ENT Service who assumes responsibility for securing clinical studies, complete clinical work-up, and final disposition of this patient. In consultation with the Chief of Service and the audiology branch of the ENT Service, the results of at least three



View of Ear Mold Laboratory. In order to obtain the best possible functioning of hearing aids, individualized patient ear molds are fabricated here ("tailor made") with precision. However, special and constant care is also exercised in the accommodation of the ear to the mold. (Official U.S. Navy Photograph, Photographic Laboratory, USNH, Philadelphia, Penna.)

consistent series of tests are evaluated and determination of the need for Aural Rehabilitation is made.

The final selection and issue of a hearing aid as a part of the Aural Rehabilitation program presupposes:

1. Extensive series of hearing tests that must meet acceptable standards of consistency. Over sixty per cent of the patients tested are not given a hearing aid because of improved test results prior to admission to Aural Rehabilitation classes.
2. Fabrication of individual ear mold with constant attention given to the accommodation of the ear to the mold.
3. The selection of a hearing aid from a variety of aids available to each patient and suitable for his particular loss. Information is provided about each aid and final selection must meet certain criteria of acceptability including optimal performance as measured by actual test.

4. Continued training in the use of the hearing aid. The patient is taught the care and use of the aid, the recognition of its limitations, and is helped in the preliminary adjustment period of hearing aid use.
5. Continued emphasis on improved communication is maintained by the lecture and practice sessions in auditory training, speech reading and recognition of typical audible and visual clues.

Aural Rehabilitation has been adapted, also, to meet the needs of those individuals who suffer a slight loss of hearing or a loss which is limited to the higher frequencies with normal or near normal hearing in the mid- and lower frequencies. A hearing aid is of little or no value to this patient who, nevertheless, may miss many of the audible clues essential to good intelligibility and discrimination of sound. This patient must turn to speech reading as the only possible source of improve-

ment in the understanding of the spoken word. Aural Rehabilitation for this patient consists of an understanding of the physiology of hearing, the characteristics of his own hearing loss and of the problems typical of this hearing loss. It is safe to say that to an equal or greater degree than the hearing aid wearer this patient must learn to compensate for the loss of auditory clues by an increased awareness of audible and visual clues.

More recently a new phase of this program has been introduced with the specific objective of instructing personnel with some slight impairment of hearing in the prevention of further damage by reason of exposure to noise. This phase includes the practical measure of fitting and issue of ear defenders (V-51R type ear plug) and instruction in their use by the ear mold technician.

The term Aural Rehabilitation used in describing this program and the name of this clinic, and utilized as the basis of authority for transfer of patients to this Center, may overshadow or eliminate any consideration of other functions of this clinic in this hospital. If the transfer of an ENT patient to this facility is considered only in terms of requiring aural rehabilitation, a strong possibility exists that inadequate use may be made of a facility organized and equipped to receive and often solve other problems associated with hearing and speech disorders. Speech therapy, determination of need for a hearing aid, the value of an aid to a patient, the thorough evaluation and final diagnosis of hearing disorders, and degree of incapacity for duty are routine functions for which the clinic (by reason of physical equipment and personnel) is admirably suited. This could be readily overlooked if the transfer of patients is considered only because of expressed need or recommendation for Aural Rehabilitation. This is particularly true in those known instances where hearing aids are issued at some stations without thorough evaluation and adequate facilities for determination of the value of the hearing aid for the individual concerned.

Constructed as hearing clinic, sound-treated throughout, the physical facilities are well suited to the evaluation of organic hearing loss. Equipped with double and single room testing areas, the clinic employs the latest and best equipment available. Standard pure tone and speech audiometers are complemented by GSR equipment, Bekesy Audiometry, SISI adaptors, delayed speech playback equipment, and the means of performing an extensive variety of special tests. Personnel under the direction and leadership of the ENT Department are experienced in the administration of hearing tests and the evaluation of "problem" cases. The routine and the complicated hearing problems are well represented in the files of some thirty thousand hard-of-hearing "cases." This combination of physical facility, equipment and personnel is responsible for the fact that many of the patients transferred for Aural Rehabilitation because of the hearing loss measured in other

medical facilities are returned to duty following a thorough evaluation which fails to verify the loss, and often directly contradicts it. Over sixty per cent of those sent for Aural Rehabilitation and hearing aids during the past few years have not required hearing aids. A few of these patients had been issued hearing aids prior to transfer. It might well be assumed that a large percentage of this group would have been issued hearing aids if transfer for rehabilitation purposes had not been accomplished. This is not necessarily a reflection on the clinical judgment or audiometric evaluation of the referring hospital, but a tribute to the maintenance of very accurate operating electronic equipment in the hands of experienced personnel. It provides sufficient testimony to confirm the wise decision of the Bureau of Medicine and Surgery requiring that all Naval and Marine Corps personnel suspected of sufficient hearing loss to require a hearing aid or separation from active duty or duties should be transferred for full and final evaluation. By means of prolonged, repetitive testing with insistence on accurate, consistent results, the individual is assured of proper evaluation of his disability, and the Navy is protected from unjust claims of disability. It is obvious that the Center is not being used by other medical facilities for full and final evaluation of all hearing losses prior to final disposition, since many cases have been referred to this Center by the Navy Physical Review Council. Further evaluation has been requested in these instances in which separation from the service via other U. S. Naval hospitals and Physical Evaluation Boards has been questioned as to the merits of the claimed disability. In some of these instances, personnel on temporary retirement with disability rating of 40% to 60% have been redefined as 10% disability or less following complete and extensive evaluation. One may well consider whether this type of complete hearing evaluation prior to final separation (despite the hardship of travel, etc.) might be a wise utilization of the Aural Rehabilitation Center which could result in economies of manpower and dollars for the U. S. Navy Medical Department.

Perhaps additional emphasis should be given to the implications and procedures which are basic to the term "Aural Rehabilitation." Statistics appear to indicate that some degree of rehabilitation is routinely administered by means of more intensive and extensive evaluation of hearing loss. Included in these statistics are those who were sent to duty because a hearing aid was not indicated. These figures could suggest that some "gave-up" and returned to the ways of the normal hearer during or following prolonged tests. They could point to others whose questionable hearing loss led to final psychiatric diagnoses. More recently, these statistics have highlighted those, who, upon reevaluation of claimed disability following separation from service, appear to have been in need of more extensive studies prior to separation. Not all "cases" of hearing prob-

ADDENDUM I

	Total Services (Tests and Treatments)	New Patients
1963 (12 months)	22,002	2084
1964 (First 6 months)	10,096	1230

Military Personnel Visits

	<i>In Patients</i>	<i>Army</i>	<i>Out-Patients Navy & MC</i>	<i>A. F.</i>	<i>Others</i>	<i>O. P. Total</i>	<i>TOTAL</i>
1963 (12 months)	1313	63	1321	159	372	1915	3228
1964 (First 6 months)	623	41	775	55	327	1198	1821

Dependents

	<i>Visits</i>	<i>Services</i>
1963 (12 months)	1092	2368
1964 (First 6 months)	824	1877

Others

(VAB, FBI, Civil Service, Retired, etc.)

	<i>Visits</i>	<i>Services</i>
1963 (12 months)	820	2823
1964 (First 6 months)	629	1649

Aural Rehabilitation Patients

	<i>Number Sent</i>	<i>Number given Rehabilitation</i>	<i>Hours of Rehabilitation</i>	<i>Hearing Aids</i>
1963 (12 months)	128	40	3001	24
1964 (First 6 months)	49	21	1038	16

Speech Services

	<i>Military</i>	<i>Dependent</i>	<i>Veterans Administration</i>
1963 (12 months)	371	410	118
1964 (First 6 months)	225	389	147

lems are resolved to the satisfaction of everyone concerned. Nevertheless, more (not less) testing and information are necessary.

This clinic's twenty years of experience in dealing with the hard-of-hearing service member on active duty makes possible one final observation. In the man whose auditory acuity has been "improved" by a hearing aid, his hearing has been "aided", not restored. No flat answer can be given to the question of qualifications for continued duty on the basis of standard test results. Only when hearing loss is properly evaluated as to type and degree, only when the demands of rate and station have been weighed, and total performance of the individual has been contrasted, can a justified recommendation of separation from service or retention in service be made.

A unique opportunity exists here for a thorough evaluation and determination of fitness for duty by the staff of the ENT Service. The days spent in complete evaluation of hearing loss and hearing problems, ob-

servations of attitude, motivation, and individual use of hearing aid, during the course of Aural Rehabilitation, provide the opportunity for an informed and considered judgement prior to a recommendation for continued duty, a waiver of physical standards, or separation from the Armed Services.

If concentration on the theme of Aural Rehabilitation tends to overshadow other functions of the Hearing and Speech Clinic, specific mention should be made of the facilities that exist for the improvement of the other member of the team essential to auditory communication, namely, intelligible speech.

Speech therapy which may play a part in the Aural Rehabilitation process exists, nevertheless, as an independent discipline. Treatment of varied speech disorders is extensive and is limited only by the fact that speech instruction is usually individual instruction, and individual instruction is time consuming. Many children (dependents of Navy, Marine Corps, Army, Air Force and Coast Guard personnel) are sent for developmental

disorders of speech. All are evaluated, and some are scheduled for therapy; others are directed to various schools and local agencies for treatment where it is available. Pre-school children who have hearing problems and who have been fitted with a hearing aid at age of two or three years are included in this group. However, children are only a segment of the typical schedule of patients seeking help for stuttering, aphasia, local paralysis of phonation, dysphonias, and other possible disorders of speech. In a special category, the reeducation of the laryngectomized patient is undertaken through the teaching of esophageal or pharyngeal voice.

The speech therapist, the audiologist, and the con-

sultant service member of other departments work toward a total program of improvement for those who may suffer impairment of either the sending (speech) or the receiving (hearing) apparatus of communication. In this atmosphere, a class of EENT Technicians undergoes training in a facility providing excellent opportunity to become acquainted with the gamut of special test equipment and hearing problems.

It is doubtful that a classification of patients would be of particular interest, but for the statistically minded, Addendum I provides information on both the type and number of patients seen at the Aural Rehabilitation Center, Hearing and Speech Clinic, U. S. Naval Hospital, Philadelphia, Pa. in the past eighteen months.

Peritoneal Dialysis

LT D. L. Kettering MC USN. From the Proceedings of the Monthly Staff Conferences of the U.S. Naval Hospital, NNMC, Bethesda, Md., 1963-1964.

The purpose of this paper is to present a simple, effective technique for the management of acute or exacerbations of chronic renal failure which is applicable by any Naval Medical Officer in practically any locality with a minimum of laboratory and professional support. This technique is peritoneal dialysis which entails lavaging of the peritoneal cavity with a balanced electrolyte solution.

The peritoneum is a serous membrane which lines the wall of the abdomen and its viscera and consists of two layers: a stroma of loosely arranged connective tissue bundles covered by flat polygonal mesothelial cells. The peritoneum is well supplied with capillary and lymphatic networks and acts as an inert semipermeable membrane through which crystalloids and water move freely in both directions depending on the osmolarity of the fluid compartments.

Ganter, a German physician, is given credit for first treating patients by peritoneal dialysis in 1923.¹ Seligman, Frank and Fine did much of the basic clinical work in this country in the 1940's.^{2, 3, 4} Grollman gave further impetus to this technique leading to the present widespread clinical use today.^{5, 6}

TECHNIQUE

The two basic components for peritoneal dialysis are

a lavage tube and sterile electrolyte solutions.

There are plastic and nylon lavage catheters produced commercially. We have found an 8-inch polyvinyl (chloride) ridged tube with 60 hand-punched holes to be very effective. The ridging prevents kinking and blockage by omentum. The tube is placed in the posterior pelvis of the peritoneal cavity through a trocar in a small midline incision 1-2 inches below the umbilicus. The surrounding tissues are sutured snugly in layers about the catheter. This can be performed at the bedside under local anesthesia. Once in place, the tube can be used for several weeks, if necessary, without change.

(A slide was projected showing the details of the catheter in the abdomen.)

Two liters of commercially available balanced electrolyte solution are rapidly run into the peritoneal cavity in 5-10 minutes. After 1-2 hours for dialysis across the peritoneal membrane, the electrolyte bottles are lowered and the fluid drains by gravity within 10-15 minutes. The process can be repeated continuously or intermittently, depending upon the clinical status of the patient. If necessary, more than two liters can be infused at one time to speed the rate of dialysis. Commercially available electrolyte solutions are listed. (Figure 1)

Fig. 1—ELECTROLYTE SOLUTIONS

Solution	Na m Eq/L	K m Eq/L	Ca m Eq/L	Mg m Eq/L	Cl m Eq/L	HCO m Eq/L	Calculated Osmolarity (m O sm./L)	7.0% Glucose
							1.5% Glucose	
Inpersol (Abbott)	140.5	0	3.5	1.5	101.0	44.5	371.5	677.4
Peridial (Cutter)	140.0	0	4.0	1.5	102.5	43.0	371.0	677.0
Dianeal (Baxter)	141.0	0	3.5	1.5	101.0	45.0	372.5	678.4

Because most uremic patients are hyperkalemic, there is no potassium in the solution. As dialysis proceeds, it may be necessary to add rm. eq. KCL/L of lavage fluid to prevent hypokalemia, especially if the patient is on digitalis. If the patient is overhydrated, higher concentrations of glucose, such as 7%, may be used for rapid removal of edema fluid due to increased osmolarity of the lavage fluid. The solutions should be warmed to body temperature in a water bath to prevent diarrhea and abdominal cramps from bowel irritation. Ten mg. of heparin and 25 mg. of tetracycline are added to one liter of each lavage cycle to prevent blockage of the dialysis tube with fibrinocellular clots and as prophylaxis against peritonitis.

After the physician has inserted the tube, the process of dialysis can be performed by a nurse or corpsman. One daily set of blood chemistries is usually adequate to regulate the number of lavages from day to day. The ECG serves as a sensitive index of hyperkalemia which can be easily obtained in the evening. The comatose patient requires no intravenous fluids or tube feedings during periods of continuous dialysis as he metabolizes the glucose from the lavage fluid. One accurate daily weight is the best index of the state of hydration.

Doolan has demonstrated 80% equilibration of plasma and dialysate urea in one hour and nearly full equilibration in two hours.⁷ The two-hour dialysis is adequate in ordinary cases, but where advanced potassium intoxication, severe uremia with acidosis, drug intoxication or intractable pulmonary edema is present, the one-hour dialysis is used.

Grollman⁸ has further modified the dialyzing fluid by adding human serum albumin in order to remove bilirubin from the serum of a severely jaundiced patient with serum bilirubin levels of 85 mgs.%. He was able to remove 250-270 mg of bilirubin in a single dialysis. This modification would be of use in removing other protein-bound substances such as barbiturates and salicylates from the serum more rapidly.

CLINICAL USES

Review of the recent literature shows the conditions

in which intermittent peritoneal dialysis has been used clinically (Figures 2, 3, 4.).

Fig. 2—INDICATIONS FOR PERITONEAL DIALYSIS

I. Primary Renal Disease

- (a) Acute Renal Failure
 - (1) Acute tubular necrosis⁷
 - (2) Nephrotoxic Poisoning
 - (3) Acute glomerulonephritis⁹
- (b) Acute exacerbation of chronic renal failure
 - (1) Exacerbation of underlying disease
 - (2) Intercurrent infection
 - (3) Surgical procedure

Fig. 3—INDICATIONS FOR PERITONEAL DIALYSIS

II. Non-Nephrotoxic Intoxication

- (a) Bromides
- (b) Barbiturates¹⁰
- (c) Salicylates¹⁰
- (d) Methyl alcohol¹²
- (e) Glutethimide (Doriden)¹¹
- (f) Salt¹³
- (g) Boric Acid¹⁴

Fig. 4—INDICATIONS FOR PERITONEAL DIALYSIS

III. Miscellaneous

- (a) Hepatic Coma¹⁵
- (b) Intractable edema¹⁶
- (c) Preoperative preparation¹⁶
- (d) Brain injury¹⁷

(e) Uric acid nephropathy^{18, 19}

(f) Failure of hemodialysis due to shock or hemorrhage tendencies

I would like to describe briefly a case we treated on Ward 3A by peritoneal dialysis:

R. L. was a 23 year-old Caucasian male transferred to NNMC for management of acute renal failure secondary to fat emboli and shock following fractures of the left tibia and fibula.

On admission, the patient was comatose and had a tracheostomy tube, left leg in a cast and a positive right Babinski sign. The remainder of the physical examination was unremarkable.

His urine output was 145 cc the day prior to transfer. Laboratory studies on admission revealed: BUN 300 mg.%; Na 130 m. eq.; K 5. 3 m. eq.; Cl. 110 m. eq.; and Ca 3.5 m. eq. He received 134 peritoneal lavages over the following 18 days with the lowering of the BUN to 59 mg%, urine output of over two liters per day and regaining of consciousness. His hospital course was complicated by a stress duodenal ulcer with hemorrhage, bronchopneumonia, gram-negative infection shock and death from ventricular fibrillation 41 days after admission.

These events illustrated the effectiveness of peritoneal lavage in acute renal failure and that the major cause of death today following acute renal failure is infection and not metabolic imbalance or cardiac decompensation.

CONTRAINDICATIONS

Recent abdominal surgery, peritonitis, multiple abdominal wounds, and marked abdominal distention are contraindications to peritoneal dialysis. Potential wound breakdown, infection and hemorrhage have been listed as reasons not to use peritoneal dialysis after recent abdominal surgery until the 5th to 8th postoperative day.²⁰ However, Burns, et. al. have reported using this technique 56 hours after repair of a perforated duodenal ulcer with chemical peritonitis in a patient with chronic glomerulonephritis without incident to the laparotomy incision or patient.¹⁶ Bowel sounds returned after the first postoperative dialysis. If peritonitis develops during dialysis, antibiotics are infused into the peritoneal cavity and dialysis stopped. However, patients with peritonitis and abdominal wound infections have been dialyzed successfully and this is not an absolute contraindication. Miller described a case of *B. welchii* peritonitis with acute renal failure successfully treated with peritoneal dialysis.²¹ Multiple abdominal wounds make dialysis ineffective due to leakage of fluid. Marked abdominal distention has the inherent risk of bowel perforation from insertion of the trochar.

COMPLICATIONS

The complications of peritoneal dialysis are as fol-

lows (Figure 5).

Fig. 5—COMPLICATIONS OF PERITONEAL DIALYSIS

MAJOR	MINOR
1. Peritonitis	1. Obstruction of Catheter
2. Overhydration	2. Leakage around Catheter
3. Perforation of Abdominal viscus with Trochar	3. Bleeding from Trochar Insertion
	4. Abdominal Discomfort
	5. Ileus
	6. Hypoproteinemia Edema

It is the opinion of those using this technique in recent years that it is safe and effective. (Figure 6).

Figure 6

Series	No. Of Pts. seen	Deaths
Burns, et. al. (Brigham) ¹⁶	136	0
Maxwell, et. al. (U San Fran) ²⁰	76	0
Miller (Bristol, Eng) ²¹	45	0
Pateras, et. al. (GWU) ²²	30	0
Cohen (Hamilton, Ont) ²³	14	0
Doolan, et. al. (Oak. NH) ⁷	11	0
Etteldorf, et. al. (U of Tenn) ⁹	5	1 *
TOTAL	317	1

* Overhydration of 3 month-old infant due to no glucose in lavage fluid.

SUMMARY

A relatively simple, safe, and effective means of treating renal failure has been presented. It has the practical military advantage of being applicable in small dispensaries or hospitals with a minimum of professional and laboratory support, especially during times of national crises when transfer to large renal centers is not possible.

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FROM THE NOTE BOOK

NAVAL MEDICAL RESEARCH REPORTS

U. S. Naval Medical Research Institute, National Naval Medical Center, Bethesda, Md.

1. Structural Transitions of Lysozyme: MR 005.06-0001.01 Report No. 23, May 1963.
2. A Molecular Structural Basis for the Excitation Properties of Axons: MR 005.09-0020.02 Report No. 4, May 1963.
3. The Maximum Sarcomere Length for Contraction of Isolated Myofibrils: MR 005.08-0020.01 Report No. 8, June 1963.
4. Cytoecology of Temperature: MR 005.02-0001.07 Report No. 11, September 1963.
5. The Effects of Certain Cations and Antibiotics on Blood Digestion in Two Species of Mosquitoes: MR 005.09-1401.01 Report No. 8, December 1963.
6. Human Reliability Implications of the U. S. Navy's Experience in Screening and Selection Procedures: MR 005.12-2003.01 Report No. 3, December 1963.
7. Alterations in Flycolysis by Cell-free Rat Brain Homogenate Under High Oxygen Pressure: MR 005.14-3001.02 Report No. 3, December 1963.
8. Engineering in Biomedical Research, Lecture and Review Series No. 64-1, January 1964.
9. Practical Solutions to Problems of Thirst in Closed or Open Spaces: MR 005.02-0011.01 Report No. 3, January 1964.
10. Digenetic Trematodes of Fishes from Palawan Island, Philippines. Part II. Five Opecoelidae, Including Three New Species: MR 005.09-1601.1 .5, January 1964.

11. Digenetic Trematodes of Fishes from Palawan Island, Philippines. Part III. Families Hemiuridae and Lepocreadiidae: MR 005.09-1606.01 Report No. 10, January 1964.
12. Unfinished Business. Lecture and Review Series: No. 64-2, March 1964.
13. Effective Temperature Scale and Its Modifications: MR 005.01-0001.01 Report No. 6, March 1964.
14. Heat Stress During Training Operations: MR 005.01-0001.01 Report No. 8, March 1964.
15. A Cursory Survey of the Intestinal Parasites in Indigenous People of Nan-Kan Island, Matsu Archipelago: MR 005.09-1606.01 Report No. 11, March 1964.
16. Soluble Proteins of Fresh Human Bone and Dentin: MR 005.12-5000.12 Report No. 8, March 1964.
17. Studies on the Cell Envelope of *Wolbachia Persica*: MR 005.09-1200.02 Report No. 16, April 1964.
18. Indirect Hemagglutination with the Trachoma Agent and Related Microorganisms: MR 005.09-1200.03 Report No. 6, May 1964.
19. Studies on a Common Bedsonia-Group Antigen (CBA) Found in the Yolk of Hen's Eggs: MR 005.09-1200.05 Report No. 3, May 1964.

U. S. Naval Medical Research Unit No. 3, Cairo, Egypt

1. *Haemaphysalis cornigera* shimoga subsp. n. from Southern India (Ixodoidea, Ixodidae): MR 005.09-1402.3, April 1964.

2. *A Haemaphysalis kyasanurensis* sp. n., a Member of the formosensis Group in Southern India and Ceylon (Ixodoidea, Ixodidae): MR.005.09-1402.3, April 1964.

U. S. Naval Medical Field Research Laboratory, Camp Lejeune, N. C.

1. The Reliability of Automobile Accident Experience in a Military Sample: MR 005.12-2504-1.1, July 1964.
2. Service Test of Foot-Powered Hypodermic Jet Injection Apparatus: MR 005.12-6001.6, July 1964.
3. Possible Role of T-Strain Mycoplasma in Nongonococcal Urethritis: MR 005.09-1501.1.5, August 1964.

U.S. Naval Air Development Center, Aviation Medical Acceleration Laboratory, Johnsville, Penna.

1. Plotting and Analyzing Cumulative Response Curves in Operant Conditioning Studies: MR 005.13-0002.16 Report No. 12, June 1964.
2. A Discussion of Medical Monitoring in Relation to Safety in Centrifuge Operations: MR 550.13-1004.11 Report No. 10, June 1964.
3. Displacement and Durational Characteristics of Lever Pressing in Fixed Ratio and in Extinction: MR 005.13-0002.16 Report No. 13, July 1964.

FILMSTRIP SERIES AVAILABLE FROM PHS, DHEW, FOR EDUCATION OF DIABETIC PATIENTS

"Just One in a Crowd," a completely new filmstrip series for diabetes patient education, has just been released by the Public Health Service, U.S. Department of Health, Education, and Welfare.

It is designed to help educate the 2,000,000 known diabetics and the 200,000 new diabetics that are being diagnosed every year. Each of these persons must be taught, under the direction of his physician, how to manage his disease. Each must be taught the rudiments of dietary control, physical health, insulin administration, and several testing procedures—all at once.

Prepared by the Diabetes and Arthritis Program, Division of Chronic Diseases, this six-part series presents basic information on diabetes in a colorful and easily understood fashion. It contains an introductory lesson on diabetes, itself, two lessons on diet, lessons

on physical health and medication, and a concluding lesson that reviews the entire course. Each fifteen-minute session is complete and can be used separately, followed by a question and answer period.

The series comes in a set, with an instructor's manual, in slide or filmstrip format with the audio portion available on both tape and record. It is filmed in color on 35 mm frames and can be used in standard slide projectors.

The filmstrip may be borrowed, free of charge, from the Public Health Service Audiovisual Facility, Atlanta, Georgia.

DR. RASKIND WINS ALL-NAVY TENNIS CROWN IN THREE SETS

For his second year in a row Lieutenant Richard H. Raskind MC USN, successfully captured the "All Navy" Tennis Championship. The defending champ won the honor at the All Navy Matches, played at Newport, R. I.

A southpaw in the tennis field and a native New Yorker he was crowned after defeating Ensign Ed Austin in three sets. Austin who represented the Pacific Fleet, lost three sets in a row 6-2, 6-2, 6-1. Another trophy for Saint Albans was Raskind winning the doubles championship.

The tennis champion had to fly by helicopter to and from Newport for the All Navy Matches. Also being the only Ophthalmologist serving at St. Albans, Lt. Raskind was unable to enter the Inter-Service Tourney.

LT Raskind, who is assigned to the Eye Clinic, swept through the District matches, mowing down all opponents with his sensational play. He repeated the same feat in the North Atlantic Regional matches. In winning the title he encountered the cream of the Navy's tennis world.

Born in New York City in 1934, LT Raskind started his tennis career at the age of 13. While attending Horace Mann High School, in 1950, he won the Eastern Inter-Scholastic Championship. He has also won the New York State title playing in the National Tennis Championships at Forest Hills, Long Island.

After graduating from Horace Mann High School, he entered Yale University, where he was captain of the tennis team. Upon graduating from Yale he entered the University of Rochester Medical School where he received his M.D. degree. LT Raskind is the son of Dr. David M. Raskind, of Forest Hills, Long Island. —From St. Albans Naval Hospital NEWS 5(7): 1 and 3, September 1964.

YELLOW FEVER VACCINATIONS

The Washington Heights Health Center of New York City offers free yellow fever vaccinations for travelers,

supplementing the free inoculations available at the U. S. Public Health Service clinic in downtown Manhattan.—Public Health Reports 78(12): 1060, December 1963.



DENTAL SECTION

SPECIALIZATION IN DENTISTRY

Excerpts from the Principles of Specialization in Dentistry which were adopted at the 51st Annual Session of the FDI, Stockholm, Sweden 1963.*

Purpose of Principles. The purpose of these principles is to provide recommended standards on the definition, recognition, education and organization of specialists in dentistry. They may also provide guide lines for the orderly growth of specialization in countries which wish to develop or expand a formal programme.

Use of Term "Specialists". The use of the term "specialist" does not have universal acceptance in the dental profession. The claim to professional superiority which is implied in the word has caused a search for an equivalent which would not appear to erect hierarchical values among those who render dental health service. The general recognition by the public of the term "specialist," however, may suggest its continued use until more acceptable terminology is available and accepted through popular and professional usage.

The dental profession should determine as early as possible in its national programme, the term by which it wishes to identify those who fulfill the functions of those who are presently termed specialists.

General Practice and Specialization. The general practitioner in dentistry is permitted to perform all of the professional acts which are authorized in the statute under which he is qualified or licensed. The specialist has the same basic legal status but must also demonstrate a greater degree of competence in a particular area of dental practice. Such competence can only flow from education, training and experience beyond that of the general practitioner. Specialization, therefore, is deemed to be a supplement to, and not a replacement of, general practice in dentistry.

Objective of Specialization. The basic objective of a programme for specialization in dentistry is to identify to the public and to the profession the practitioner who

has special competence in rendering an exceptional service to the patient. A programme of specialization may also be useful in stimulating organization, education and research in a particular area of dentistry. *Specialization should not be utilized to foster a reduction in the educational requirements and responsibility of the general practitioner.* Nor should it be used to provide better status for the practitioner, or to facilitate economic benefits which exceed the value of the service rendered to the patient.

Recognition of Specialists. A programme for specialization should involve some mechanism for recognizing the specialist and for identifying him to the public and to the profession. Two of the more common methods are: (1) recognition by the profession through its national organization; (2) recognition by legal statute through a governmental or academic body.

Recognition by Profession. Recognition of the specialist by the profession produces greater flexibility in meeting needs as they are determined by members of the profession. Since this method is voluntary in nature, it can invoke no sanctions, except those of an ethical nature, thus making discipline and enforcement more difficult.

The profession may recognize specialists by: (1) defining the areas of dental practice in which specialization will be recognized; (2) establishing the educational and experience requirements for practice in a special area; (3) establishing boards which validate educational and experience qualifications and administer the examinations for entrance into specialist status; (4) awarding certificates, through the specialist examining boards, to those who have successfully completed the requirements and achieved the status of a "diplomate" who is qualified to practice in a special area.

Recognition by Legal Statute. Recognition by legal statute provides immediate means for discipline and enforcement in the area of specialty practice. Legal recognition may not always be entirely consistent with the wishes of the profession and may be more difficult of amendment to meet changing needs. Administration and enforcement are subject to the control of the legally established agency which may not always be wholly aware of the professional problems that are involved. Under the statutory method of recognition, the areas of special practice, the requirements for specialization and modes of enforcement are set down by law and are administered by an appropriate governmental or academic agency to which authority is assigned.

Definition of Areas of Practice. The definition and number of the areas of dentistry in which specialized practice is permitted will vary in accordance with needs and traditions. The definition of special areas of practice in dentistry depends upon a logical separation of dental services into categories characterized by fundamentally different objectives and distinct biological and physical approaches to diagnosis, treatment and prevention of disease, involving knowledge and skills beyond those which can normally be expected for the general practice of dentistry.

The following criteria may be helpful in identifying areas which may be susceptible to the development of specialized practice:

1. The area should have importance in the protection of the health and welfare of the patient;
2. The area should be one in which the general practitioner has frequent need to refer patients in order to provide an exceptional service to the patient;
3. The area should be one that calls for special knowledge and skills requiring intensive study and extended clinical and laboratory experience beyond undergraduate dental training in order to perform services of difficult or unusual nature;
4. The area should be one in which there is evidence that there is need for the full time services of the specialist to meet a particular public need;
5. The area should be one in which a sufficient number of educational institutions provide formal courses which will qualify practitioners in the special area;
6. The area should be capable of a precise definition of its limits so as to establish the qualifications required for practice in the special area and to restrict the specialist to rendering services in a well defined field.

The number of special areas in which practice is authorized requires extended consideration in order to avoid fractioning the services of the profession into inadequate and meaningless segments which will not permit the best service to the patient.

In initiating or developing a programme for specialization, the designation of a limited number of special areas appears to be desirable. Two areas are generally

recognized as meeting all of the major requirements for designation as special areas of practice: oral surgery and orthodontics. Initial recognition of these two areas will permit the accumulation of experience which may eventually lead to the approval of other special areas as need is demonstrated.

Specialty Organizations. The development of organizations devoted to the interests of special areas of dental practice should be encouraged on the basis of a well-defined and close relation to the profession and national dental association. Such organizations can assist in developing knowledge and research in the special area; assist in meeting the specialized needs of its members, and encourage the development of higher standards of education and practice for the area.

Conclusion. Programmes for specialization in dentistry should be developed on a planned basis by giving appropriate weight to the need, the stage of professional development and related social and economic factors in a given country. A well organized and controlled programme for specialization can assist in providing a better service to the patient and thus make its contribution to the health of the nation.

* Federation Dentaire Internationale.

BRIEF HISTORY OF THE RUBBER DAM

Harry J. Winner DDS, *Dental Survey* 40(10): 76-85, October 1964.

Since 1964 is the 100th anniversary of the introduction of the rubber dam, it would seem appropriate to learn something about the man whose ingenuity made Dam Dentistry possible, the struggle for recognition of its value in restorative dentistry and the controversy that raged over who really gave birth to the idea of the rubber dam. It is hoped that the recognition of the 100 years of faithful service given by the rubber dam will reawaken today's practitioners to the value of its use in modern dentistry.

Excerpts from a meeting of the Connecticut Valley Dental Society reported in the *Canada Journal of Dental Science*, Vol. IV, 1877-1879, reports the history of the discovery of the rubber dam as told by Dr. Barnum:

"At the time the idea of the rubber dam dawned upon my mind, I was practicing in Monticello, Sullivan County, New York. It was the result of much persecution from the inroads of saliva, I had spent many an hour, weary and distracted, battling against its incursions. Many a sleepless night had I over sad failures . . . with the one absorbing question ever before me unanswered, 'How shall I keep the cavities dry?'"

"The answer came; and may I say that I was led to the discovery in this manner. In plugging cavities near the gum, I had adapted the use of rubber rings or ligatures around the necks of the teeth, crowding them well up under the free margins. . . . Also in plugging the upper teeth I placed a piece of oilskin beneath the napkin, it preventing the accumulation of moisture in the floor of the mouth from being taken up and soaking the napkin. These two things led me to the thought, 'Can I join the ring of rubber to the apron of oilskin?'"

"In the fall of 1863, I procured some sheet or rubber cloth for the same purpose I had been using the oilskin. How soon after that the idea of cutting a hole in the rubber and slipping it over the tooth came to me, I cannot call it to mind; but this I have well fixed, that on the fifteenth day of March, 1864, a case presented itself of a cavity in a lower molar, standing alone, on the left side in a mouth as wet—well, as water gushing from every duct could make it.

"In a sort of half-desperate way, and partly to try the new idea, I cut a hole in my napkin protector—and over the tooth it went. There I found I had the ring of

rubber and an apron combined! There was the rubber dam! And from that time until it was presented to the profession the following summer I developed, step by step, many of its important points."

Although Dr. Barnum originated the idea of the rubber dam, his uncle, Dr. J. W. Clewes, introduced it (giving credit to Dr. Barnum) to the profession at a meeting of the New York Dental Society in June 1864.

The statement by A. H. Brockway as it appeared in a transcript of the New York Odontological Society is not inappropriate today, even though it was made in 1885:

"It is not too much to say that this device (rubber dam), simple as it is, has been one of the most important and valuable contributions to operative dentistry that have thus far been made. By its proper use not only is the discomfort of the patient lessened, but the mind of the dentist being relieved of all anxiety regarding the encroaching fluids, and his hands from the necessity of holding anything in place, a much higher quality of operations is possible than could otherwise be attained."

A STUDY OF THE USE OF HOME RELINERS IN DENTURES

Craig R. Means BS DDS MSc, Howard University, College of Dentistry. Washington, D.C., J Pros Den. 14(4): 623-634, July-August 1964.

The author reports a study of 29 patients who had added or applied home liner materials to their dentures. The results are in agreement with opinions held by The Council on Dental Research and the Council on Dental Therapeutics of the American Dental Association, that the promotion of such products is not in the public interest and that the use of them presents many hazards to the health of the patient.

In several of the dentures, the author noted that as many as seven layers of reline material could be counted. Findings were that the reliners contributed to the imbalance of the dentures, loss of retention and stability, overextension of the borders, collection of food and other debris upon the tissue surface of the denture, development of pseudo-epitheliomatous hyperplasias, and irritations which could lead to precancerous or cancerous lesions.

The article stresses the responsibility of the dental profession in educating the patient completely in the use and care of dentures and the need for periodic professional treatment after the dentures are placed.

OROPHARYNGEAL CANCER IN BHOPAL

J Indian Med Assoc 42: 519-521, June 1964. JAMA 189(12): 979, Sept 21, 1964.

V. Agarwal MD and M. M. Arora MD, who teach at the Gandhi Medical College in Bhopal, India, report that of all malignant diseases found in Bhopal, 40.5% are cases of oropharyngeal cancer. A total of 200 cases were seen by the authors during the last few years. The highest incidence of this disease is found in the 4th and 5th decades of life. Since all patients seen by the authors had a history of chewing tobacco, the authors feel that this might be an important etiological factor in the causation of oropharyngeal cancer.

DIETARY SELECTIONS OF PERSONS WITH NATURAL AND ARTIFICIAL TEETH

A. Albert Yurkstas, DS MS DMD, and W. H. Emerson, DMD. Tufts University School of Dental Medicine, Boston, Massachusetts. J Pros Den 14(4): 695-697, July-August 1964.

The authors cite a study of the diet of 28 young adults with natural dentitions as compared with that of a similar number of subjects wearing dentures who were selected at random.

The results indicated that denture wearers eat more of the following foods: Cheese, processed fruit, fish, raw fruit, eggs, cereals, breads and cooked vegetables.

whereas those with natural dentitions consume more meat, soup, desserts, beverages, raw vegetables, sandwiches and salads. Of interest is the fact that those with natural dentitions ate over twice as many sandwiches and five times as many salads as those with dentures. Although the study showed that both groups ate nearly equal amounts of bread, cooked vegetables, and meats, there was some selection within food items on the basis of food form.

The clinical manifestations of the study point to the fact that new denture patients especially should be urged to prepare the basic nutritional foods in a form that is easily comminuted. To this end the dentist has a prime responsibility in providing a list of especially prepared foods that not only will assure an adequate diet, but also ease the patient over the transitional period of adjustment.

PERSONNEL AND PROFESSIONAL NOTES

Cement-Alloy Program. From time to time, the Dental Division receives comments relative to the Cement-Alloy Program instituted several years ago at the Naval Training Center, Great Lakes, Illinois. As a matter of general interest, the following is quoted from a letter recently received at the Bureau:

"On 19 August 1964, a young sailor came into my office for a dental examination. On 12 July 1963, the following cement-alloys were placed at Great Lakes: 2-O-F, 3-OL, 31-O-F; on 15 July 1963, 5-MOD, 14-O, 15-OF. All were still in good service except that placed in tooth #14, which had been replaced at San Juan with an MOD amalgam. I have been using zinc oxide-alloy fillings in children's teeth with much success so far. The material has a sedative quality, sets up hard, manipulates well and seems to hold up well."

—S/LCDR John F. Lessig, DC USN, U.S.
Naval Radio Station (T), Ft. Allen,
Puerto Rico

Foreign Medical Officers Visit NDC Norfolk. Thirteen foreign military medical officers from twelve foreign countries who are undergoing a fourteen-week training course, administered by the U.S. Naval Medical School, Bethesda, Maryland, recently visited the U.S. Naval Dental Clinic, Norfolk, Virginia. They were members of the 7th class conducted by the Naval Medical School Foreign Officer Department. CAPT W. B. Lett, DC USN, Commanding Officer (Acting), CAPT J. P. Arthur, DC USN, and CAPT L. F. Abel, DC USN, of U.S. Naval Dental Clinic, Norfolk, Virginia, and CAPT E. H. Joy, MC USN, Officer-in-Charge, U.S. Naval Preventive Medicine Unit #2, Norfolk, Virginia, were joint hosts.

Touring the area were CAPT Aureliano Rey Merodio, Argentina; CAPT Nelson Hora Oliveira and CAPT Gilson Ferreira de Almeida, Brazil; CDR Tso-an-Chen, China; LT Mariano Maura Reyes, Dominican Republic; CDR Ralf von Gregory, Germany; CAPT Konstantinos Rizos, Greece; CDR Jalal Hamidi, Iran; CDR Antonino

Aliquo, Italy; CAPT Tong Pil Choe, Korea; CDR Wessel R. Vermeer, Netherlands; LCDR J. Pico Brotons, Spain; and LCDR Dang Tat Khiem, Vietnam. CAPT J. H. Stover Jr., MC USN, Commanding Officer, U.S. Naval Medical School, Bethesda, Maryland and CAPT J. M. Hirst, MSC USN, Director of the Training Course at the Naval Medical School, were in charge of the tour.

Participation Urged in Science Fair Activities. This is the season for junior high and high school students to select science fair studies. Members of the Dental Corps are encouraged to assist students interested in dental health and dental science in their projects. The American Dental Association makes the following material available to guide students: *Frontiers in Dental Science* (50¢) from Scholastic Book Services, 904 Sylvan Ave., Englewood Cliffs, New Jersey; *Dental Projects for High School Science Students* (25¢ for single copy; 20¢ each for 10 or more) from Science Service, and *ADA Catalog* describing dental health literature, information and films on career opportunities in dentistry (single copy on request). Write: Dr. Sholom Pearlman, ADA, 222 East Superior Street, Chicago, Illinois.

Navy Dentist Presents Essay in Mexico. CDR Walter N. Johnson, DC USN, U.S. Naval Dental Clinic, Camp Pendleton, California, presented as essay entitled, "Current Concepts of Periodontal Therapy," before the Seventh Annual National Convention of Oral Surgeons of Mexico, held 31 October through 4 November 1964, in Uruapan, Michoacan, Republic of Mexico. *Naval Dental Reserve Key Personnel Changes at BUMED.* CAPT Robert F. Tuck, DC USNR, Commanding Officer, U.S. Naval Reserve Company 9-3 (Chicago) for sixteen years, was recently called to active duty to serve as Head, Reserve Branch, Dental Division, Bureau of medicine and Surgery. In this capacity, he relieves CAPT Harry J. Wunderlich, DC USNR, who has held this position since June 1957.

CAPT Wunderlich's next duty station has not been determined as of this writing. CAPT Tuck has been active in the Naval Dental Reserve since his release from active duty in 1945. In addition to annual active duty for training, he recently attended the Naval War College at Newport, Rhode Island, and has served on a Reserve Officer selection board. He has served as President of the Chicago Alumni Chapter, Xi Psi Phi;

the Illinois Section, American College of Dentists; and the Chicago Dental Society. He is also a member of the Odontographic Society of Chicago; Academy of General Dentistry, and the Illinois State Dental Society, of which he has served as delegate to the American Dental Association. CAPT Robert C. McDonald, DC USNR, relieved CAPT Tuck as Commanding Officer, U.S. Naval Reserve Company 9-3.



OCCUPATIONAL MEDICINE

HEAT ILLNESS AND SOME RELATED PROBLEMS

A. W. El Halawani MD, Saudi Arabia, World Health Organization, WHO CHRONICLE, 18(8): 288-298, Aug 1964.

Since the word "heat" in the term "heat illness" is often assumed to refer solely or mainly to environmental or external heat, it must be stressed that the really crucial factor is the sum of endogenous (metabolic) and external heat. In hot surroundings, men are particularly liable to suffer heat illness if they are exercising or working; and probably nowhere in the world are natural climates too hot to be endured by resting men. The basis of heat illness is disordered physiology resulting from the function of thermoregulation, and only perhaps in heat stroke or in heat hyperpyrexia can it be said that thermoregulation has failed; in other words, the heat disorders are byproducts of active and almost invariably successful thermoregulation.

The nomenclature and classification of the heat disorders are at present in an unsatisfactory state. The International Classification of Diseases contains the now obsolete term "sunstroke", and lists together the effects of heat and insolation, so that it includes "sunburn"; in addition, it has been outdated by growing understanding of the pathogenesis of heat exhaustion, and it does not include the syndrome of anhidrotic heat exhaustion identified in troops in the Second World

War. The revision of the International Classification will, without doubt, take the various criticisms of the classification of heat disorders into account.

From a clinical point of view, the heat disorders can be listed and defined as follows:

1. Heat syncope (heat collapse; exercise-induced heat exhaustion): syncope or sensations of giddiness or acute physical fatigue during exposure to heat, resulting from peripheral vasodilatation, a collapse in vasomotor tone, venous pooling, hypotension, and cerebral anoxia, and occurring in the absence of observable water and salt depletion.

2. Heat edema: slight edema of the extremities and particularly of the feet and ankles, usually limited in occurrence and duration to the first week or ten days of exposure of the affected individual to truly tropical heat.

3. Water-depletion heat exhaustion: progressive water depletion due to inadequate replacement of water losses in prolonged sweating, characterized by thirst, fatigue, giddiness, oliguria, fever, and, in the advanced stages delirium and death. Since in normal circumstances the onset of thirst prevents clinically overt water depletion, the disorder is rare and occurs when water

is in seriously short supply, or when there are contributing factors such as vomiting or diarrhoea.

4. Salt-depletion heat exhaustion (heat exhaustion type I): progressive salt depletion due to inadequate replacement of salt losses in prolonged and heavy sweating, characterized by fatigue, nausea, vomiting, giddiness, muscle cramps, and, in the late stages, circulatory failure. The plasma levels of sodium and chloride are below average, and in successive urine samples before treatment sodium chloride is consistently negligible or absent.

5. Heat cramps (mill cramps; miner's, stoker's, cane cutter's, or fireman's cramps): painful spasms of voluntary muscles following hard physical work, prolonged thermal sweating, and the drinking of large amounts of unsalted water. Heat cramps often have no associated symptoms, and differ probably only in this respect from the muscle cramps seen in salt-depletion heat exhaustion.

6. Prickly heat (miliaria rubra; lichen tropicus; heat rash): an erythematous papulo-vesicular rash accompanied by pricking or tingling sensations, encountered only in circumstances which provoke prolonged thermal sweating and commonest in humid environments where the skin is constantly wetted by unevaporated sweat.

7. Anhidrotic heat exhaustion (thermogenic anhidrosis; tropical anhidrotic asthenia; heat exhaustion type II): a state of exhaustion and heat intolerance affecting men exposed for several months to a hot climate, accompanied by the appearance of numerous discrete vesicles (miliaria profunda, or mammillaria) in the skin mainly of the trunk and proximal parts of the limbs, and by diminution or absence of sweating (anhidrosis) in the areas affected by the rash. The disorder was observed in troops during the Second World War, but apparently few servicemen suffer from it in peacetime conditions, while civilians scarcely figure in the literature on the subject.

8. Heat stroke and heat hyperpyrexia: heat stroke is a state of thermoregulatory failure of usually sudden onset, following exposure to very high external temperatures or strenuous exercise in less severe heat, characterized in its classical form by disturbance of the central nervous system, generalized anhidrosis, and a rectal temperature in the acute stage above 40.6° C (105° F). It is frequently fatal. Sweating in the presence of coma and hyperpyrexia is an uncommon variant reported recently.

Heat hyperpyrexia differs from heat stroke in that the patient is conscious and rational, and sweating may be present; the rectal temperature is above 40.6° C (105° F), but tends to be lower than in heat stroke.

Clinical recognition of another entity—acute heat fatigue—may possibly be justified; this is a deterioration in efficiency observed when men engaged in skilled tasks are exposed to very high ambient temperatures.

The effect is particularly noticeable in those who find their job mentally exacting even in thermally comfortable surroundings. This "disorder" is far more relevant to industrial than to natural climates, and the experimental evidence for it relates mainly to various reaction-time and visual-vigilance tests.

Finally, some reference should be made to tropical fatigue, deterioration, or neurasthenia. It has long been argued that, as a result of the prevailing heat or humidity, immigrants to the tropics from cooler countries are apt to suffer a variety of symptoms such as lassitude, reduced efficiency and morale, or even acute anxiety states, all lumped together as expressions of nervous debility. The present majority opinion is that there is no specially tropical form of neurasthenia, and that, if environmental in origin, symptoms correctly referable to neurasthenia arise from isolation, monotony, and similar dissatisfactions common to small expatriate communities anywhere in the world. Fatigue is thought to be the best available word to describe the impaired efficiency, inability to concentrate, and death of ambition claimed by some immigrants (and some observers) to be the result of living in hot climates; and the importance of climatic heat or humidity in the causation of these phenomena is not yet clearly established. This is a problem which merits continued study; but the current industrial development of tropical countries both invites and requires a wholly objective investigation of the working efficiency of home-bred and home-based Asian, African, and other populations, along the lines being taken in the Sahara. However, adaptation in the sense of performance is less relevant than the acute heat disorders to the medical problems of the Mecca Pilgrimage.

The Etiology of the Heat Disorders. The elements and events which culminate in heat disorders can be divided into two main groups. The first comprises the prevailing air temperature, humidity, movement, and radiant heat, energy expenditure and therefore body heat production in the circumstances in question, and the heat exchanges between the environment and the individuals exposed; these are all measureable and susceptible, up to a point, of arithmetic treatment and analysis. The second group concerns the essentially human elements, namely individual variations in response to heat in degree of acclimatization, behaviour, age, build, clothing, physical fitness, and health, and other occasionally critical factors; these are seldom measurable, particularly in a civilian population selected, for example, as in the Mecca Pilgrimage, solely on the basis of religious belief.

A common preliminary approach to a study of the effect of environmental temperatures is to use standard meteorological data by which to compare the incidence of heat disorders in the climate in question with the recorded incidence in apparently similar circumstances. Herein lies the first barrier to progress, for the tem-

peratures prevailing in the area where heat illness is occurring might differ significantly from the data supplied by the nearest appropriate meteorological station; furthermore, our knowledge of the circumstances in which heat disorders are a problem is based increasingly on a far more detailed study of the environment than is provided by the usual methods of reporting meteorological data. A plea has been made recently for meteorological data presented in terms of means and standard deviations therefrom, and better still, for the following information to be made available for conditions by day: (a) the average dry-bulb temperature for the hottest hour of the day; (b) the average relative humidity for the hottest hour of the day; (c) the wind force over the period 11 a.m. to 5 p.m.; and (d) the presence of solar radiation, or preferably the average black-globe temperature in direct sunlight, for the hottest hour of the day.

In certain limited and more or less unvarying circumstances, the measurement of one single component of the climate may serve as a practical guide for the prediction of heat illness; easily the best example is that provided by industrial and particularly mining environments, where heat stroke is known to occur when men work in saturated air at a wet-bulb temperature of or above 30° C (86° F). If, however, the limiting environmental temperatures above which heat disorders occur are ever to be identified with reasonable precision and in a way suitable for universal application, a measure of one single component of the climates concerned is not enough. This applies equally to the identification of the upper limit of temperatures in which men feel comfortable or can work without objective evidence of dangerous or cumulative physiological strain; and many attempts have been made to integrate into a single index the effects of two or more of the several factors that influence heat exchanges between man and his environment. As a result, various heat stress indices have been elaborated and described. They include the effective Temperature (ET) Scale, the Wet Bulb Globe Temperature (WBGT) Index, the Cumulative Discomfort Index (Cum. DI), the Predicted Four-Hour Sweat Rate (P_4SR), and the Heat Stress Index (HSI).

Of these indices of heat stress, the P_4SR is generally regarded as the best. Young, fit, and acclimatized men can tolerate hard work in climates corresponding to P_4SR values of up to 4.5, while for the unacclimatized the upper limit is probably not more than 3. Above these limits, an increasing number of men find the conditions beyond their endurance, and (from the scanty evidence available) heat disorders begin to be a significant problem. The identification of the upper limits of environmental heat compatible with body-temperature balance at various rates of work or exercise is an approach which has been studied in relation to the mining industry and appears to hold some hope

for the prediction of heat stroke in severe but relatively unchanging circumstances.

It is tempting to view heat stroke as the result solely of heat loads which cannot be dissipated even when the body's heat-losing mechanisms are in good shape and fully operative. In other words, the condition may be the inevitable result of intolerable combinations of environmental and endogenous heat. Heat stroke, however, is by no means confined to such obviously dangerous circumstances. At a lower level of heat stress, for example, with a P_4SR index beginning to rise above 4.5, it is hardly possible to say more than that an increasing number of men will find conditions beyond their endurance, mainly because adequate information on the point is lacking, but also because there can never be a wholly accurate method of forecasting the heat disorders. In the individual case, be it of heat stroke or of heat exhaustion, individual factors are implicated to a varying degree.

Inadequate acclimatization to the prevailing heat is perhaps the most important of these. Of British troops entering Kuwait at short notice in the summer of 1961, a contingent straight from the United Kingdom suffered many heat casualties, whereas a contingent sent from nearby Sharja in the Trucial Oman had none at all. The influence of acclimatization is hardly surprising, since it greatly relieves the initial strains put upon thermoregulation, fluid balance, and the circulation. It may be, however, that some of the casualties among travelers shortly after they enter the heat are due to individual susceptibility, in terms perhaps of an inherent weakness in thermoregulation or in water and electrolyte balance. There is no evidence to support this, but the generally low incidence of the heat disorders in most natural and many industrial environments is suggestive.

When civilian populations of widely ranging age are exposed to unaccustomed heat, the elderly are the most commonly and severely affected. During heat waves in Chicago, Cincinnati, and St. Louis, 80% of those who suffered from one or other of the heat disorders were above 40 years of age. As might be expected, heat stroke in middle and old age is frequently associated with degenerative cardiovascular disease, particularly arteriosclerosis, hypertension, and myocardial ischaemia; and since (on the few occasions it has been attempted) electrocardiography in young men with heat stroke has shown impressive degrees of myocardial damage, it may be that degenerative cardiovascular disease influences survival as well as susceptibility.

Infants are also peculiarly prone to heat stroke, apparently more because of their vulnerability to water depletion than because of any primary defect of thermoregulation. Age apart, general health can be important, particularly in relation to fluid and electrolyte losses in intercurrent diarrhoea or vomiting, the effect of atopic eczema or other extensive skin disease on the integrity

of the sweating mechanism, and the possible influence of febrile infections on thermoregulation. Precisely to what extent fever interferes with thermoregulation in hot surroundings is problematic. It seems bound to raise the body "thermostat" level and indeed has been shown to do so, and the combined effect of the fever, physical exercise, and environmental heat might be dangerous; in addition, pyrogenic agents such as typhoid vaccine have been shown to interfere with the production of thermal sweat. A point worth remembering in this context is that the belladonna alkaloids, such as atropine, hyoscine, and scopolamine, and to a lesser extent certain antihistamine drugs depress thermal sweating, and from time to time atropine or one of its analogues is implicated as having contributed to a case of fatal heat stroke.

Other factors which deserve mention are build and sex. Obese individuals are at a special risk of heat illness, and this has been attributed to their difficulties in heat dissipation on account of the greater ratio of body weight to surface area. The influence of sex is not clear, simply because men and women are seldom exposed together to the same conditions of heat and work; the Mecca Pilgrimage figures show that heat disorders are twice as prevalent in men as in women, but the sex ratio of the pilgrims has not been ascertained; an opportunity appears to exist for more information on this point. A recent study in the USA has shown that women become acclimatized to heat in much the same way as do men, but with some differences suggesting that heat dissipation from the body might be more difficult than in men.

In addition to constitutional variations between individuals, there are important differences in the way in which they behave when exposed to heat, particularly in respect to the clothing they wear and of how effectively they replace fluid and electrolyte losses in sweat. It is clear, however, that clothing is not a problem on the Mecca Pilgrimage. Clothing interferes to some extent with the evaporation of sweat, although not to a significant degree in hot and dry climates, while white clothing has been shown to reduce by half the solar heat load. This means that in Arafat and Mena white and loosely-fitting garments of a permeable material are protective to a degree which more than offsets any hindrance to sweat evaporation.

So far as the replacement of water and electrolytes lost in sweat is concerned, experience has taught that generalizations are hazardous. This is particularly true of salt requirements, a subject in which conclusions from limited observations have masqueraded too often as universally applicable facts. The facts are that some ethnic groups subsist happily on diets containing practically no salt; that most European and American expatriates living in the tropics take, and need, no more salt than at home; that even in quite arduous conditions of exercise and environmental heat,

troops in India and in Israel (as was pointed out during the technical discussions at the twelfth session of the WHO Regional Committee for the Eastern Mediterranean) have shown no need of extra salt; and that salt-depletion heat exhaustion is a well-documented and in some circumstances common disorder. The explanation of these facts appears to lie in salt-conservation mechanisms which adjust loss to intake, and which can reduce urinary sodium and (in hot surroundings) sweat sodium loss to negligible levels. If salt intake is high, urine and sweat sodium levels are correspondingly so, and it is in just this state of favourable balance that the average European enters unaccustomed heat and begins to sweat; if thereafter the heat is severe and the going hard, and if water losses in the sweat are replaced, salt depletion may reach clinical significance before conservation mechanisms are fully operative. This suggests that salt-depletion heat exhaustion is primarily a disorder of the unacclimatized, which indeed it is. When a sufficiently high salt intake is maintained, the fall in sweat sodium that usually accompanies heat acclimatization does not occur; it is dependent therefore on the stimulus of a negative salt balance, and it has long been believed that aldosterone is the mediating agent. The question seems to have been settled by recent work showing that the sodium content of drug-induced eccrine sweat is diminished by the administration of aldosterone. The facts concerning the salt requirements of Mecca pilgrims must await detailed and laboratory identification of the types of heat exhaustion encountered, and of the groups (if any) in which clinically overt salt depletion occurs. Pilgrims from Europe may be affected, and possibly also tribesmen from the interior of Saudi Arabia if they are accustomed to brackish water and drink unsalted water while in Mecca; there is a precedent in Kuwait for this situation, as was also pointed out in the technical discussions at the twelfth session of the WHO Regional Committee for the Eastern Mediterranean. The one generalization which seems safe and of universal application is that for each set of circumstances there is a minimum and obligatory intake of salt.

The problem of water depletion on the Mecca Pilgrimage has evidently been tackled by the Saudi Arabian Government in a commendably realistic way. If circumstances permit, water requirements are regulated by water-craving or thirst to the extent that clinically overt water depletion rarely occurs, whereas there is in man no salt-craving comparable to that found in some animals. In terms, however, of habit rather than of health or survival, the water intakes of individuals vary considerably. Variations in intake are readily observed in hot climates, particularly when the behaviour of groups at different stages of adjustment to the circumstances is compared. In the process we call heat acclimatization, the volume of sweat produced in response to a standard heat load increases;

and if substantial amounts of sweat are involved, it is clear that water intake may rise accordingly. On the other hand, permanent tropical residents appear to drink far less water than do newcomers, and this is, particularly true of desert environments in which water is scarce. It seems that long-term adaptation to water shortage, heat, or both greatly improves water economy and thereby lowers water requirements. The mechanisms by which this is achieved are still obscure, but, so far as thermoregulation is concerned, it has been suggested that long-term acclimatization may bring a more even distribution of sweat over the body surface, and it seems possible also that sweat losses may become as little as they need be for adequate heat removal. Speculation apart, it is clear that among a population so diverse in origins and habits as the Mecca pilgrims water requirements must vary widely. During the fulfilment of the more strenuous of their religious

rites, however, all the pilgrims seem liable to develop the phenomenon known as voluntary dehydration.

It is well known that a mild degree of water depletion develops during work in hot surroundings, and is usually made good at mealtimes or in leisure hours. Voluntary dehydration is symptomless, but it is associated with increased heart rates and body temperatures and presumably therefore is better avoided if possible. The phenomenon is associated also with diminished sweating, although probably not to a degree significant in terms of thermoregulation. It has been shown in Bahrein that, unless palatable drinking fluids are within easy reach, voluntary dehydration persists indefinitely and must increase the risk of water-depletion heat exhaustion occurring as a result of a hitch in water supplies, increased and sustained effort, or intercurrent diarrhoea. (To be continued)

HUMAN RABIES—MINNESOTA

The first case of human rabies reported for 1964 occurred in a 10-year-old boy from Wabasha County, Minnesota. On August 5, 1964 the boy was bitten by a skunk on the right wrist and left index and fifth fingers, while sleeping in a tent. His brother, age 3 was also bitten on the wrist. The wounds were not clean puncture wounds but appeared to be chewed.

Duck embryo vaccine was administered on the day of occurrence and a total of 14 daily doses were subsequently given. Both children were also given a booster dose of tetanus toxoid.

On August 25, the 10-year-old boy noticed numbness of the right forearm. The next day he had fever and generalized myalgia. On August 27 his temperature was recorded as 101° F and he complained of a stiff neck. The following day he was admitted to a Rochester, Minnesota hospital because of ascending paralysis, hallucinations, incoordination, stiff neck, and fever to 104° F. He did not convulse or salivate. Cerebrospinal fluid examination revealed 124 cells, all lymphocytes; the peripheral white blood count was 12,700. He expired on September 1 and an autopsy was performed. Fluorescent antibody tests on the boy's brain were negative. Six mice were inoculated with brain tissue from the patient on September 2. On September 16, one of the mice became paralyzed and was sacrificed.

Negri bodies were demonstrated in the mouse brain by the Williams stain. The fluorescent antibody stain was also positive. The biting animal was not captured. (Reported by Dr. D. S. Fleming, Director, Division of Disease Prevention and Control, Minnesota State Health Department.)—From: *Morbidity & Mortality Weekly Report*, 13(38): 330, 25 Sept. 1964.

ANTISMOKING DRUGS

The recent U.S. Public Health Service publication on health hazards of cigarette smoking has stimulated widespread use of patented medications intended to curb the desire for smoking.

Many aircrew members are taking these medications in the belief that they have no possible medical effects. Most of these preparations contain lobeline, a powerful drug which may have effects on the heart and consciousness. Flying personnel should be informed that the usual cautions against self-medication apply to all anti-smoking drugs.—U.S. Air Force Med Ser Jour, XV(III): 29, March 1964.

INTERNATIONAL CERTIFICATES OF VACCINATION

Next to the passport, the most important document for foreign travel is the *International Certificate of Vaccination*. Every day hundreds of world travelers who forgot this fact run into delays in quarantine. The reason: They fail to present a valid international certificate of vaccination against smallpox. In the United States the certificate is published as Public Health Service form 731, "International Certificates of Vaccination," revised June 1961. It is given out with the passport application. The certificate may also be obtained from local and State health departments or from offices of the U.S. Public Health Service. In addition, it may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402, at 10 cents a copy. Travel agencies and transportation companies wanting to provide the certificate as a service to their clients may purchase copies at \$5.00 per hundred.

RESERVE SECTION



NEW INDIVIDUAL DRILL PAY SCALES*

These are the rates of pay for individual drills by Reservists effective from September 1 under the new pay law. The amounts shown for longer-service 0-2s and 0-1s and marked by asterisks are payable only to officers credited with over four years' active enlisted service. An 0-3 credited with such service receives \$22.21 at the "over 14 years" point instead of the \$21.87 received by 0-3 without enlisted service. Pay of E-1s with less than four months remains \$2.60.

Pay Grade	Under 2 yrs	Over 2	Over 3	Over 4	Over 6	Over 8	Over 10	Over 12	Over 14	Over 16	Over 18	Over 20	Over 22	Over 26
COMMISSIONED OFFICERS														
O-8 ..	34.84	35.88	36.73	36.73	36.73	39.46	39.46	41.34	41.34	43.05	44.93	46.64	48.52	
O-7 ..	28.94	30.92	30.92	30.92	32.29	32.29	34.17	34.17	35.88	39.46	42.20			
O-6 ..	21.44	23.58	25.11	25.11	25.11	25.11	25.11	25.11	25.97	30.07	31.60	32.29	34.17	37.07
O-5 ..	17.15	20.16	21.53	21.53	21.53	21.53	22.21	23.40	24.94	26.82	28.36	29.21	30.24	
O-4 ..	14.47	17.60	18.79	18.79	19.13	19.99	21.35	22.55	23.58	24.60	25.28			
O-3 ..	11.79	15.03	16.06	17.77	18.62	19.30	20.33	21.35	21.87					
O-2 ..	9.38	12.81	15.38	15.89	16.23	16.74*	17.60*	18.28*	18.79*					
O-1 ..	8.04	10.25	12.81		13.67*	14.18*	14.69*	15.20*	15.89*					
WARRANT OFFICERS														
W-4 ..	12.04	14.69	14.69	15.03	15.72	16.40	17.08	18.28	19.13	19.82	20.33	21.01	21.70	23.40
W-3 ..	10.95	13.50	13.50	13.67	13.84	14.86	15.72	16.23	16.74	17.25	17.77	18.45	19.13	19.82
W-2 ..	9.58	11.79	11.79	12.13	12.81	13.50	14.01	14.52	15.03	15.55	16.06	16.57	17.25	
W-1 ..	7.94	10.42	10.42	11.28	11.79	12.30	12.81	13.33	13.84	14.35	14.86	15.38		
ENLISTED PERSONNEL														
E-9 ..							14.86	15.20	15.55	15.89	16.23	16.57	17.43	19.13
E-8 ..							12.47	12.81	13.15	13.50	13.84	14.18	14.52	15.38
E-7 ..	6.88	9.40	9.74	10.08	10.42	10.76	11.10	11.45	11.96	12.30	12.64	12.81	13.67	15.38
E-6 ..	5.86	8.20	8.54	8.88	9.23	9.57	9.91	10.42	10.76	11.10	11.28			
E-5 ..	4.84	7.18	7.52	7.86	8.37	8.71	9.05	9.40	9.57					
E-4 ..	4.08	6.16	6.49	7.00	7.35									
E-3 ..	3.31	4.95	5.30	5.64										
E-2 ..	2.86	4.10												
E-1 ..	2.77	3.76												

* Naval Reserve Association News, XI(10): 2, 5, 8, October 1964.

NAVAL RESERVE SELECTION BOARD DATES ARE SET*

Here is a lineup of boards which will meet next year to consider Naval Reserve officers for promotion selection:

To Rear Admiral (Line): January 5 (includes continuation).

To Rear Admiral (Staff): January 5 (includes continuation).

To Captain (Line): January 12 (includes TARs).

To Commander (Line): January 19 (includes Waves and TARs).

To Captain (Staff): March 2 (includes continuation and TARs).

To Commander (Staff): March 2 (includes Waves and TARs, same membership as Captain board).

To Lieutenant Commander (Line): March 9 (includes Waves and TARs).

To W-2, W-3, W-4: March 23.

To Lieutenant (Line): April 13 (includes Waves).

To Lieutenant Commander (Staff): (includes Waves and TARs).

To Lieutenant (Staff): April 20 (includes Waves, same membership as lieutenant commander board).

NEW-TYPE MOB ORDERS ON WAY TO RESERVISTS*

Those card-type mobilization orders are fast disappearing and a new type of mobilization order is being distributed.

These new orders are about 4" by 8" and can be folded easily for insertion in the wallet where they should be carried at all times.

The new MOB orders are a tear-off form, prepared at the Naval Reserve Manpower Center in Bainbridge, Md. In most cases, they direct the holder where and when to report to mobilization.

The high-speed machines at Bainbridge now make it possible to correct and re-issue MOB orders more frequently to reflect not only changes in the Navy's anticipated mobilization requirements, but also to reflect the individual officer's promotion, change of address, etc.

The Manpower Center expects to be making the change at the rate of about 6000 a month. Officers with the old card-type orders should destroy them after receiving their new tear-off form MOB orders.

Any officer who feels an error has been made in writing of his orders, should request a change, via the chain of command, to the Commanding Officer, Naval Reserve Manpower Center, Bainbridge, Md.

MISCELLANY

REPORT ON NEW BUMED FILM, "HYGIENE FOR WOMEN" (MN-8268 A, B & C)

*Mr. Charles A. Green, Film-TV Production Division,
U.S. Naval Medical School, NNMCMC, Bethesda, Md.*

Each new generation of young people in the Service needs reminders, tailor-made to its own cultural dimensions, of principles that are as old as time. The planners and producers of a new three-part BuMed film, in color, "Hygiene for Women" (MN-8268 A, B & C), had this fact well in mind. The ideas expressed in the series are as sound and proven as their vehicle is modern and well-dressed.

The three parts are really separate and independent pictures under a general title. Part A, subtitle "Personal Health", is nineteen minutes long and has to do

with cleanliness, diet, exercise, posture and grooming. It makes the big point that the individual girl (and a most attractive one she is in all three of these pictures), can personally aid her own health and appearance and thereby contribute to the health and efficiency of the outfit of which she is a part. Offering good rules about eating and going on to very personal instructions like how to trim one's toenails after a shower, the picture is a graphic guide for any young woman, in or out of the military service.

Part B is subtitled "Reproduction and Menstruation" and is eighteen minutes long. The idea here is to let the viewer know these normal processes for what they are: normal processes. The film uses a combination of live photography and animation to explain the sexual organs, both male and female, and their function in the reproductive system. It tells the purpose of the menstrual

cycle and shows how it functions. The film points up the importance of good health and proper personal care in connection with menstruation, and adds the reassurance of telling why there can be variations in the normal menstrual cycle.

The subtitle of Part C, "Protecting Health", is a severely simple label for the large subject it discusses: The importance of self-control in social conduct, specifically drinking and sex relationships, as a means of protecting well-being. With honesty and calm, this film steps in where many a parent fears to tread; it engages and holds attention to matters from which many a young person simply walks away with a shrug and a "Don't tell me; I know all that." The picture dramatizes the effects of alcohol on the body and tells how to control them; it goes further than to say merely, "Don't drink." Then, in contrast to drinking as an acquired practice, the film discusses the sexual urge as entirely natural. It quietly dramatizes the possible results of illicit relations: illegitimate pregnancy, venereal disease, psychological upset. But the emphasis is on the basic fact that affection and sexual attraction are normal; the film offers principles that may aid in self-control in dating. Screen time is twenty-six minutes. Most of the action is live, but the transfer of disease from person to person and its effects on the body are in animation, and there is some engaging animation that symbolizes the tugging of emotions in the experience of the young adult.

These three films are intended for use by officers who train and supervise young women in the Service. Their series title "Hygiene for Women," however, should not suggest that they are suitable exclusively for female viewers. And instructors may find that they have an unexpected and enthusiastic additional audience in their own daughters (and sons).

Prints have been distributed to Naval Hospitals, Naval District libraries and certain special stations where there are large numbers of Navy women.

SOME GUIDELINES CONCERNING THE WEARING OF CONTACT LENSES BY ACTIVE DUTY PERSONNEL

Many recruits, who ordinarily wear contact lenses, are reporting to recruit training without their lenses. This causes unnecessary delay in starting their training due to the time it takes to complete an eye examination and fabricate conventional spectacles.

The Manual of the Medical Department, Chapter 15-13 (3)(f)(14), specifies that *defective vision, correctible only by contact lens, is cause for rejection*. It is not the Bureau's intention that this statement preclude any applicant from wearing contact lenses while on active duty, provided that his vision is also correctible to standards by conventional spectacles.

The purchase of contact lenses by Navy or Marine Corps personnel, at their own expense, is not prohibited.

However, the Government is under no obligation to provide or replace such lenses. It is noted that all personnel in the service who require spectacles shall be examined as necessary and provided with spectacles as indicated in BuMedInst. 6810. 4B.

DR. HENRY A. IMUS HONORED BY THE AMERICAN PSYCHOLOGICAL ASSOCIATION

The American Psychological Association has established an award in memory of Henry A. Imus, Ph.D.

Dr. Imus, at the time of his death, May 18, 1964, was Deputy Director of Research at the Naval School of Aviation Medicine, Pensacola, Fla.

The award will be given annually in recognition of outstanding research performed, in the preceding year, by a junior member of the military or civilian research staffs of the military services, according to Dr. S. B. Sells, a member of the APA.

Dr. Sells said that the award would be a perpetual reminder of the years of devoted service that Dr. Imus spent in furthering research through sponsorship and personal encouragement. He further stated that the members of the Division of Military Psychology were happy to be afforded the opportunity to express their admiration for Dr. Imus, both as a person and as a scientist.—P.I.O., USN Aviation Med. Center, Pensacola, Fla.

EGYPTIAN DOCTOR TO CONDUCT HEART RESEARCH AT THE NAVAL SCHOOL OF AVIATION MEDICINE

Dr. Hassan H. Khalil of Alexandria, Egypt has reported to the Naval School of Aviation Medicine, Pensacola to conduct heart research related to space flights. He is the assistant professor in the Department of Medicine at the University of Alexandria.

During his tour here he will work with Captain Ashton Graybiel, Medical Corps, USN, Director of Research at the School of Aviation Medicine.

He is conducting research on a new method for measuring the blood output per minute. This method has proven to be very simple, rugged and susceptible to being used in space flight research when using telemetry equipment—electronic devices for measuring pressure, temperature, radiation, etc., and transmitting the information to a distant receiver: now used in the study of outer space.

This isn't Dr. Khalil's first visit to the United States. In 1963 he conducted research at the University of Mississippi Medical Center, Jackson, Miss., and at the Cardiovascular Research Institute, University of San Francisco.

Dr. Khalil, who also holds a doctorate in philosophy, was accompanied to this country by his Swedish wife and three-year-old daughter, Karima. The Khalils also have a son, Taher, 16, who is in his second year of

medical school at the University of Alexandria. He is now the youngest of all students to ever attend a medical school in Egypt.—P.I.O., USN Aviation Med. Center, Pensacola, Fla.

ROADWAY ELEMENTS AND HIGHWAY SAFETY

The relationship of traffic accidents to roadway design and traffic control has long occupied highway and traffic engineers. "Traffic Control and Roadway Elements," a 1963 publication based on a study by David W. Schoppert of the Automotive Safety Foundation, provides a comprehensive collection of research data on the subject. Based on exhaustive review and analysis of engineering studies in the United States and abroad, the study relates accident rates to such factors as traffic volume, proportion of heavy vehicles, type and width of highway and shoulder, road alignment, highway dividers, guardrails, roadside trees, ramps, pro-

tective devices at intersections and rail crossings, vehicle speeds, one-way streets, streetside parking, and provision of sidewalks.

According to the publication, past studies have explored only the relationship between the roadway factors and traffic accidents; a general theory of accident occurrence must be stated in terms of the impact of those same factors on drivers or on the traffic stream, with impact translated into likelihood of accident occurrence. The U. S. Bureau of Roads and the Automotive Safety Foundation, which jointly financed the study, hope its publication will "foster wider and more uniform application of design features of proven safety value and spur future searches for additional facts."—Public Health Reports, 79(5): 423 May 1964.

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